

Lockout/Tagout

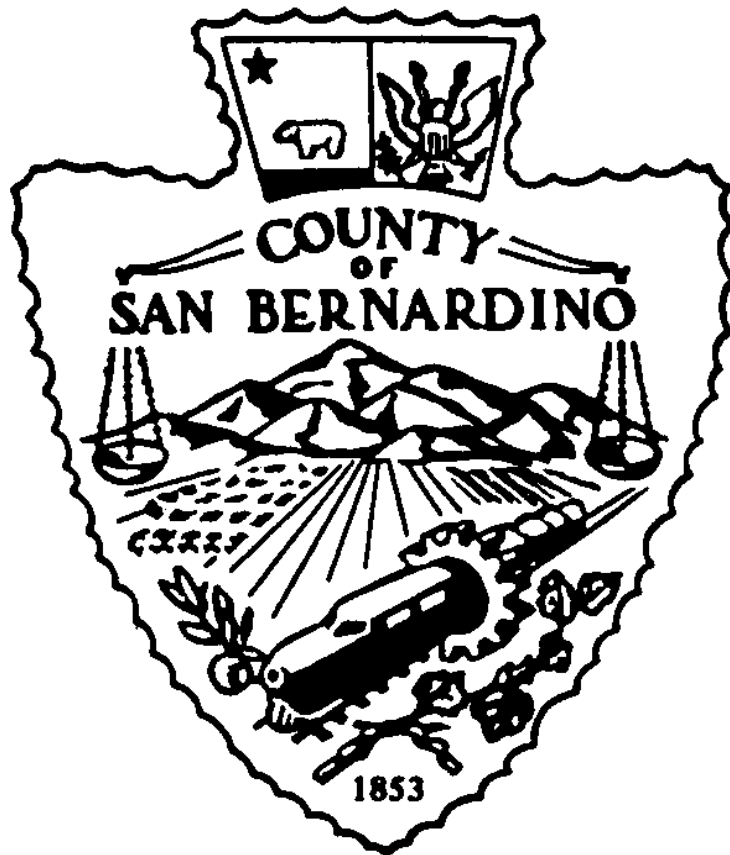


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LOCKOUT/TAGOUT/BLOCK OUT PROGRAM

SCOPE

This establishes San Bernardino County procedure to lockout, tagout, blockout or otherwise de-energize machinery or equipment during times of repair, maintenance or adjustment. The program provides standards for employee training, basic procedures to ensure safe work practices, and guidelines to be used by County departments in preparing individualized programs, if necessary.

The program identifies documentation, communication and training necessary to ensure the health and safety of County employees. **This procedure sets forth minimum standards for all County departments.** Individual departments may implement more stringent standards. Copies of department prepared programs are to be provided to Risk Management Division/Safety Section as well as included in the immediately following divider labeled "Department Program".

PURPOSE

Title 8, California Code of Regulations, General Industry Safety Orders, Section 3203, 3314, 6003(f) and Electrical Safety Orders, Section 2320. 4/5/6, 2530.86, and 2530.43 mandate specific training and procedures concerning repair, maintenance or adjustment of machinery and equipment. Section 3203 of the above referenced code specifically requires California employers to prepare written programs relative to the prevention of occupational illness, injury, and injurious exposure.

INTRODUCTION

Lockout/Tagout/Blockout requires that any energy source - electrical, hydraulic, mechanical, compressed air, potential energy or any other source that might cause unexpected movement - must be disengaged or blocked while employees are working on equipment. Sources of electrical energy must be de-energized to prevent machinery/equipment start up as well as prevent shock to employees while working on electrical equipment. A locked out and tagged piece of equipment may not be safe if there are parts that are not **Blocked** to prevent movement. Potential

energy requiring blocking may include suspended and/or spring loaded portions of equipment.

RESPONSIBILITY

Department managers are responsible for administration and implementation of this program. Program elements include:

1. Procedures
2. Identification of hazards
3. Employee training
4. Lock/Tag/Block assignment

Supervisors are directly responsible for program maintenance which includes:

1. Ensuring that all employees required to operate, clean, service, adjust or repair machinery or equipment are trained in the use of locks, tags and blocks.
2. Specifically instructing each employee to block out, de-energize, lockout and tag any equipment, machine, source of energy or system during the course of repair, maintenance, cleaning, service or adjustment.
3. Ensuring that locks, tags, and appropriate blocking devices are readily available and identifiable as belonging to a specific employee.
4. Identifying equipment, jobs and procedures that require locking, tagging or blocking out.
5. Ensuring that all procedures are followed.
6. Issuing locks, keys and blocks to employees and maintaining records that identify such equipment as assigned to specific individuals.

7. Maintaining documentation of all employee training.
8. Providing employees written authorization, when no alternatives are available, to work on unlocked or energized equipment.

TRAINING

Each County department shall prepare employee training outlines relative to lockout/tagout/blockout. Department specific training shall be documented by an outline of training to be provided all employees. Employee training shall be documented on the sample which is included in the appendix. All employees shall be trained on recognition and significance of locks and tags as well as prohibitions against arbitrary removal.

All employees shall be specifically trained in the following steps to lockout/tagout/blockout:

1. Turn off equipment and disconnect the energy source.
2. Lockout energy sources.
3. Tagout at disconnect point.
4. Release residual energy.
5. Blockout when necessary.
6. Test to assure zero mechanical/energy state.

GENERAL PROCEDURE

This program utilizes the concept of Zero Mechanical/Energy State (ZMES), which requires a source of energy, whether mechanical, electrical, active or stored, be blocked out, de-energized, or otherwise shut down. ZMES is to be established on all equipment and machinery, work processes, or operating systems that require maintenance repair, adjustment, or servicing.

The procedures outlined in this program apply to all moveable, electrically energized, or pressurized equipment and systems during installation, repair, maintenance, servicing, cleaning or adjustment. They do not apply to routine operational adjustments or set-up procedures such as adjusting work in a lathe, drill press, etc., as long as the machine operator

retains personal control over the machine or equipment.

When maintenance is required to "troubleshoot" equipment or systems while under a ZMES, locked out and tagged, the maintenance supervisor or responsible designee shall indicate "Troubleshooting" on the tag. Locks may then be removed and test instruments used.

When equipment is being balanced in place, a lock is not required. However, a "DANGER - DO NOT OPERATE" tag must be completed and placed on the starter before work begins and must remain on the starter during the balancing operation.

During the repair of steam traps, a completed, "DANGER - DO NOT OPERATE" tag may be signed by the maintenance employee and used in place of a safety lock and device.

Special procedures developed by installation engineers for securing new equipment during installation must meet this procedure's minimal requirements. Procedures developed for this purpose shall become a permanent addendum to this program after approval by department management.

In the event that it is not practical to lock out a piece of equipment, process or system, removal of power cords or fuses, disconnection of pressurized cylinders, or use of blocks to prevent movement may be used. Such alternative methods must be approved by the department manager before adoption and listed in this program as an addendum. Management personnel are the only individuals authorized to permit work on energized, unlocked or unblocked machinery or equipment. **All such authorization shall be written.**

Where several employees are involved with working on a single piece of equipment, the maintenance supervisor will designate a single individual responsible for initial shut down, tagging out, and assuring ZMES of equipment. The safety lock and device of this designated individual will be the first applied and the last removed.

The maintenance Supervisor shall verify that such designated individual is aware of the motor control center, all switches, valves and devices that need to be in a ZMES, locked and tagged.

The designated individual will verify ZMES by trying to restart the equipment and checking its interlocks after it has been locked out.

LOCKOUT/TAGOUT PROCEDURE

1. "DANGER - DO NOT OPERATE," shall be the tag used to comply with the tagout portion of this program.

- A. This tag shall be placed on the control points of machinery, processes, valves, equipment, or systems that are either under repair, defective, being serviced, cleaned, or newly installed but not yet fully operational.
- B. The tag shall be completed and placed at the control points only after ZMES has been assured.
- C. The tag shall also be placed on obsolete equipment or machinery that is in a ZMES but not yet fully isolated from an operating system.
- D. A properly completed tag shall contain a description of the equipment or system under service or repair, the purpose of the tag, the name of the individual placing the tag, time, date, and the name of the person authorizing the use of the tag. No other information is to be added to the tag.
- E. Once placed, the tag is to remain on the switch system while work is being performed; however, **this shall not exceed 30 days**. If the work extends beyond 30 days, a supervisor shall review the status and issue a new tag, if necessary.

2. LOCKS

- A. When work is being performed on machinery, equipment or processes, individual safety locks, and when necessary multiple lock

devices, will be used to secure equipment or sources of energy. This is to assure ZMES and prevent accidental start-up. **Applying locks at the start/stop button or switch is not considered safe, does not meet the standards of this program, and is, therefore, prohibited.**

- B. Safety locks shall be one key series or pattern and be issued individually to employees along with a multiple lock device.
- C. The tag of each lock must be clearly stamped with the employee's name and the lock number.
- D. Master keys for safety locks are **prohibited**.
- E. In addition to distribution lists, an extra key for assigned locks shall be maintained by the supervisor in a secure manner.
- F. Project engineers shall be assigned locks, keys, and devices for use in "remodel" or system upgrade construction. The project engineer shall apply and remove the lock and devices for the contractor. Contractors are solely responsible for lockout/tagout procedures on new construction.
- G. Safety locks, devices, and tags shall remain in place as long as work is being performed by either maintenance or outside contractor employees.
- H. If work on the equipment, process, or system has not been completed by the end of a shift, the individual assigned to such work shall

not remove locks until employees of the oncoming shift have attached locks and are instructed about the scope of work.

- I. **Once a disconnected switch or circuit breaker is locked and tagged in ZMES, tampering with the locked element to circumvent ZMES is prohibited.**
- J. Upon completion of work, the maintenance worker, operating employee, or Project Engineer shall remove locks belonging only to themselves. When all locks have been removed, the operating employee may remove the tag.
- K. In the Event of an emergency or other absence of a lock's owner, a safety lock may be removed **only by a supervisor**. This removal must not expose employees to potential injury. The duplicate key held by the supervisor should be used for such removal.

LOCKOUT CONTROL METHODS

There are many different ways to lockout a piece of equipment. Commonly, the main disconnect switch has one opening where a lock can be placed. If more than one employee works on the equipment, a lockout adapter suitable for the installation of several locks must be used, enabling all workers to lockout the machine with individual locks.

If switches are in a metal box, the box itself must be locked out. If a fuse is removed to de-energize equipment or circuits, the fuse box must be locked.

If controls are in a metal covered box, a common hasp may be welded or riveted to the door, along with a lock staple. The switch can then be "opened", the door closed and padlocked. Fuse boxes can be locked in this manner.

Machines activated by compressed air or steam include valves that control the source of energy. These valves must be locked out and the system must be bled to release energy in the form of pressure.

LOCKS

Each employee must have an individually assigned lock and maintain the only key to that lock. The lock should be substantial, durable, and must have the name of the employee on it. If necessary, locks can be color coded to indicate different shifts or types of craft. When more than one worker is servicing a piece of equipment locked out, a lockout adapter must be used which allows all workers to place locks on the disconnecting means. After all work is completed, individual locks are removed and the machine can be returned to service.

TAGS

DO NOT USE TAGS ALONE. Tags or signs are to be used in addition to locks. Tags must state:

1. The reason for the lockout.
2. The name of the employee who is working on the equipment and how that person may be reached.
3. The date and time when the tag was put in place.

TESTING EQUIPMENT DURING LOCKOUT

In maintenance and repair operations, machinery may need to be tested, and therefore energized, during the course of maintenance. Employees should be trained as follows relative to testing:

1. Clear all personnel to safety.
2. Clear away tools and materials from equipment.
3. Remove lockout devices and re-energize systems following established safe procedure.
4. Proceed with test.
5. After test, neutralize all energy sources again, purge all systems and lockout prior to continuing work.

ALTERNATIVES

Equipment circuit design or performance limitations may dictate that alternative worker protection be provided when the established lockout procedure is not feasible. If machinery must be capable of movement or circuits energized in order to perform a maintenance task, supervisors must evaluate the circumstances. No employee shall be permitted to work on unlocked machinery or energized circuits unless sufficiently experienced, properly trained, provided with appropriate protective equipment/ tools and specifically instructed on procedure.

RESTORING EQUIPMENT TO SERVICE

After the work is completed and equipment is ready to be returned to normal operation, the procedure below must be followed:

1. Remove all non-essential items.
2. Ensure that all equipment components are operationally intact, including guards and safety devices.
3. Repair or replace defective guards before removing lockouts.
4. Remove each lockout device using the correct removal sequence.
5. Make a visual check before restoring energy to ensure that workers are physically clear of the equipment.

BLOCKS

A suitable block is an important safety device to ensure that a piece of equipment is safe to be repaired or serviced. Appropriate blocks must be placed under raised dies, lifts, or any equipment that might inadvertently move by sliding, falling, or rolling.

Blocks, special brackets, or special stands, such as those which are commonly used under raised vehicles, must be made available and used by employees.

Another form of blocking is the placement of a blind. A blind is a disk of metal placed in a pipe to ensure that air, steam, or other substance will not pass through if the system is activated.

Before blinds or blocks are installed, steam, air, or hydraulic lines must be bled to reduce existing pressure. Coiled springs, spring loaded devices, or suspended loads must be released so that stored energy will not result in inadvertent movement.